



RESEARCH ARTICLE

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THE RELATIONSHIP BETWEEN TYPE II DIABETES MELLITUS AND HYPERTENSION AMONG THE PATIENTS ATTENDED AL-LEITH HOSPITAL

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ABSTRACT

This study was conducted in order to find the relationship between Diabetes Mellitus type II (D.M) and hypertension, and to know which one may cause the other from records of 53 patients who are frequently visiting the Center for Chronic Diseases. Also a questionnaire was designed to study the relationship of the two diseases among 31 patients. Considering the factors of sex, age and weight, five consecutive readings of blood pressure and blood sugar, were collected and analyzed. Also the data of the questionnaire was analyzed. The results showed that there is a association between diabetes and hypertension since the P -value < 0.05 . i.e. the development of hypertension and diabetes mellitus track each other over time. Also it was found that an elevation of blood pressure and blood sugar readings are affected by the three factors sex, age and weight.

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INTRODUCTION

When beta cells in the pancreas become damaged, the amount of insulin secreted gradually decreases, and this process continues for many years. If this condition is associated with insulin resistance, the combination of a small amount of insulin and a low level of efficacy leads to a deviation from the proper level of glucose (sugar) in the blood, in which case the person is defined as having diabetes [Weir, 1994]. Statistically, Worldwide, according to the International Diabetes Federation, more than 400 million adults have diabetes, and this will increase to more than 592 million in 2035. Every year 5 million people die from diabetes every year. Locally: In 2015, 3.8 million diabetes cases were registered in the Kingdom of Saudi Arabia. Type II diabetes has high prevalence rates in Saudi Arabia of 32.8% and is expected to reach 45.36% in 2030. According to the International Diabetes Federation, the number of deaths associated with diabetes 23,420 cases, while the cost of treatment and management of the person \$ 1145 per year [American Diabetes Association, 1996].

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Type 1 diabetes is caused by a fault in the body's immune response in which the immune system mistakenly targets and kills beta cells, the cells in the pancreas responsible for producing insulin. As more insulin producing cells in the pancreas are killed off, the body can no longer control its blood glucose levels and the symptoms of diabetes begin to appear occurs when your immune system, the body's system for fighting infection, attacks and destroys the insulin-producing beta cells of the pancreas. Scientists think type 1 diabetes is caused by genes and environmental factors, such as viruses, that might trigger the disease [Centers for Disease Control and Prevention, 2017]. Type 2 diabetes mellitus is a metabolic disorder that results in hyperglycemia (high blood glucose levels) due to the body: Being ineffective at using the insulin it has produced; also known as insulin resistance and/or being unable to produce enough insulin. Type 2 diabetes is characterized by the body being unable to metabolize glucose (a simple sugar). This leads to high levels of blood glucose which over time may damage the organs of the body. Type 2 diabetes was formerly known as non-insulin-dependent or adult-onset diabetes due to its occurrence mainly in people over 40. However, type 2 diabetes is now becoming more common in young adults, teens and children and accounts for roughly 90% of all diabetes cases worldwide.

Type 2 diabetes is a serious medical condition that often requires the use of anti-diabetic medication, or insulin to keep blood sugar levels under control. However, the development of type 2 diabetes and its side effects (complications) can be prevented if detected and treated at an early stage. Type 2 diabetes occurs when the hormone insulin is not used effectively by the cells in your body. Insulin is needed for cells to take in glucose (sugar) from the bloodstream and convert it into energy. Ineffective use of insulin results in the body becoming resistant to insulin - also known as insulin resistance, which in turn causes blood sugar levels to rise (hyperglycemia) [Diabetes Prevention Program Research Group, 2015]. Type 2 diabetes—the most common form of diabetes—is caused by several factors, including lifestyle factors and genes. Overweight, obesity, and physical inactivity. Extra weight sometimes causes insulin resistance and is common in people with type 2 diabetes. The location of body fat also makes a difference. Extra belly fat is linked to insulin resistance, type 2 diabetes, and heart and blood vessel disease. Relationship of type 2 diabetes and hypertension: High blood pressure, or hypertension, is a condition that's seen in people with type 2 diabetes.

It's unknown why there's such a significant relationship between the two diseases. It's believed that the following contribute to both conditions: obesity, diet high in fat and sodium, chronic inflammation and inactivity, And Studies have found that at least 1 in 3 patients with type II diabetes also have hypertension.. When hypertension and diabetes co-exist, the effects of one disease tend to make the other worse. This makes for a deadly combination [Diabetes Prevention Program Research Group]. Diabetes does three things that may increase blood pressure: decreasing the blood vessels' ability to stretch, increasing the amount of fluid in the body and changing the way the body manages insulin. Hypertension and diabetes generally coexist because they share similar risk factors, including being overweight, following an unhealthy diet, and living an inactive lifestyle [<https://www.niddk.nih.gov/health-information/diabetes/overview/risk-factors-type-2-diabetes>].

Patients should report any consistent blood pressure readings of 140/90 or higher to their doctors, as these may result in complications. The combination of hypertension and diabetes can be lethal, and together they can increase the risk of a heart attack or stroke. Having both conditions also increases the risk of kidney disease and problems the blood vessels of the eyes, which could lead to blindness. Smoking increases the risk of both diabetes and hypertension. Uncontrolled diabetes is not the only risk factor for hypertension. The chances of having a heart attack or stroke are further multiplied if other risk factors exist, in addition to diabetes. People with diabetes should try to minimize these risks as far as possible, for example, by choosing a healthy lifestyle [<https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/heart-disease-stroke>].

The objective of the study: TO prove the relationship between diabetes and hypertension by determining which one is the causative of the other and To prevent patients with diabetes from developing hypertension and vice versa. Subjects, materials and methods: The Subjects in this study were 53 patients (38) female and (15) men with age range from (20 – 85 years) attended to the chronic disease center in Al leith hospital and are both diabetics and hypertensive patients.

Also another group of 31 patients (17) females (14) males with co- existence diabetes & hypertension participated in this study, their data was captured on structured questionnaire. Their age range is (12- 81 years). Data collection: Sample collection and analysis took two months. Ethical considerations: before conducting the study all necessary approval were obtained.

RESULTS

Records results : Sample: We collected 53 samples from records. Their mean age 63.7 ± 14 , figure (1) shows: The males was 28% (15 patients) and the females was 72% (38 patients). Figure (2) shows that the weights range (40 Kg - 104 Kg), (mean = 79 kg). 9% (9 patients) have weights 40 – 60 kg, 54% (26 patients) with weight 61 - 80 kg. 32 % (17 patients) showed weights from 81 kg to 100 kg, and 5%(3 patients) have weights above 101 Kg. Figure (3) shows the age groups, range from 20 to 85years (mean age 63 ± 14).

The questionnaire results: Collected 31 samples from questionnaire, Figure (4) shows the order of diagnosis with diabetes and hypertension: 29% (9 patients) were diagnosed with hypertension first , while 71% (22 patients) were diagnosed with diabetes firstly. Figure(5) shows that the males were 45% (14 patients) of the sample and the females were 55 % (17 patients). Figure (6) shows the range of ages is 10 – 85. Figure (7) reflects the opinions of patients - who were diagnosed with hypertension first- that the causes can be obesity, stress or genetic factors:

11% (1 patients) suggested it is due to Obesity, Psychological stress was opinion of 22% (2 patients), while 67% (6 patients) said the genetic factors are the causes. Figure (8) reflects the opinions of patients - who were diagnosed with diabetes first - that the causes can be obesity, stress or genetic factors: 18% (4 patients) said the obesity is causative. 32% (7 patients) suggested it was due to Psychological stress and 50% (11 patients) thought it was due to genetics factor. Figure (9) showed the answer of the question: Dose the increasing of blood pressure lead to diabetes, and vice versa? 42% (13 patients) answered (yes) and 58% (18 patients) answered (no).

DISCUSSION

Diabetes and hypertension are major issues in our country and since they are irreversible and have no cure 100%, huge part of the cure depend on changing in patients life style as it written in [<https://www.niddk.nih.gov/health-information/diabetes/overview/risk-factors-type-2-diabetes>; <https://www.niddk.nih.gov/health-information/diabetes/overview/preventing-problems/heart-disease-stroke>] so it is important to understand their relationship and which one causes the other to increase patients and public awareness and take all necessary measures to prevent them. From our results of patients' records and questionnaire we concluded that our study achieved and proved the objectives of the research, which is to find the relationship between diabetes mellitus and hypertension and to determine which one is the causative of the other. Samples - from records of chronic disease center in Al leith consists of (53 patients), and the questionnaire data (31 patients) – when analyzed using *sps* programme *P-value* was less than 0.05(0.0005) , which means that there is a significant association between hypertension and Diabetes mellitus which agreed with literature review and studies done among different populations.

(1) Reports Results

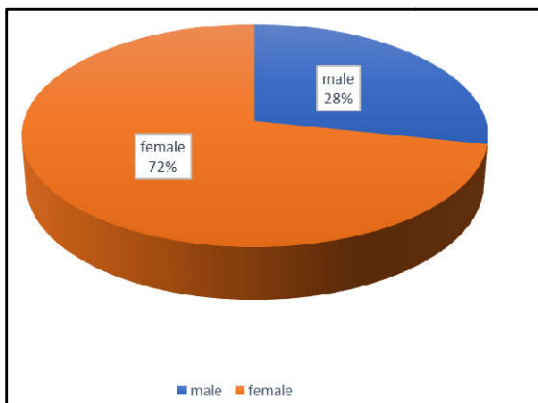


Figure 1-Sex

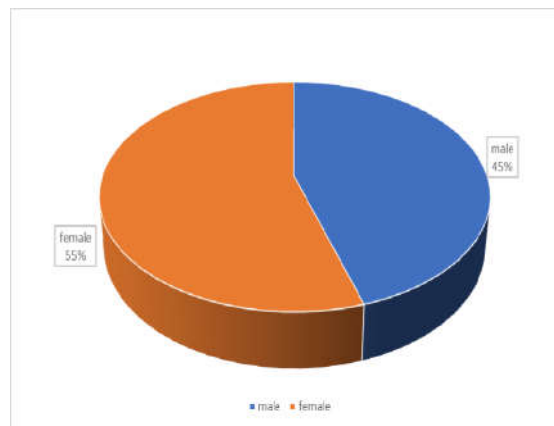


Figure 6. Age groups

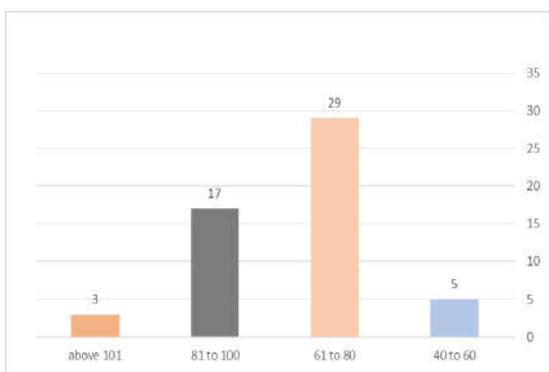


Figure 2. Weight

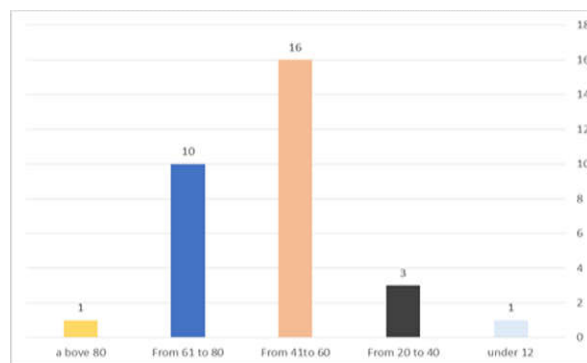


Figure 7. The causes of hypertension among patients who diagnosed firstly with it

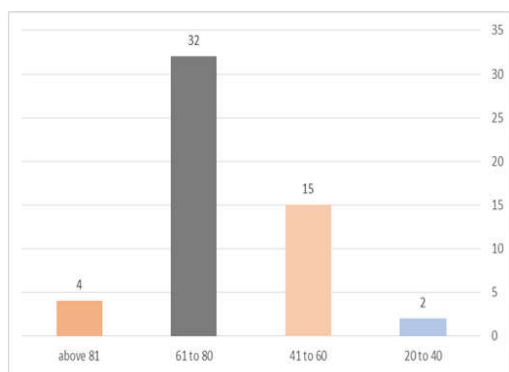


Figure 3-Age

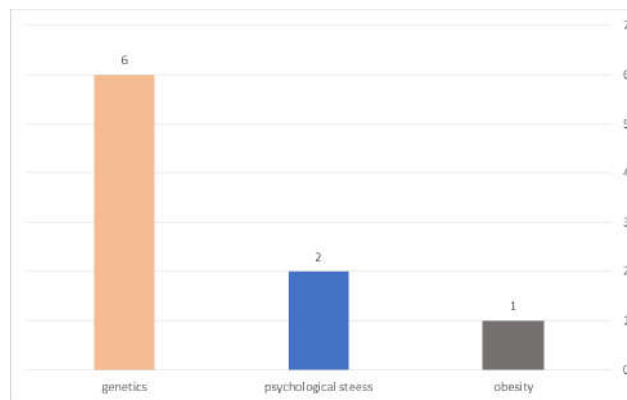


Figure 8. The causes of diabetes among patients who diagnosed firstly with it

(2) The questionnaire results

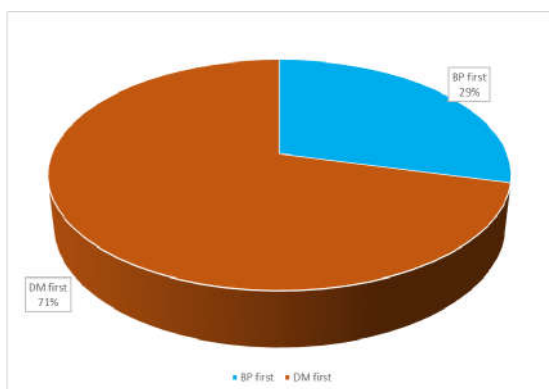


Figure 4. Order of diagnosis of diabetes and hypertension

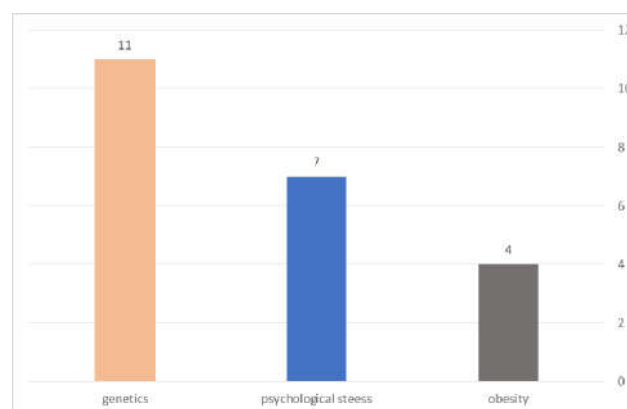
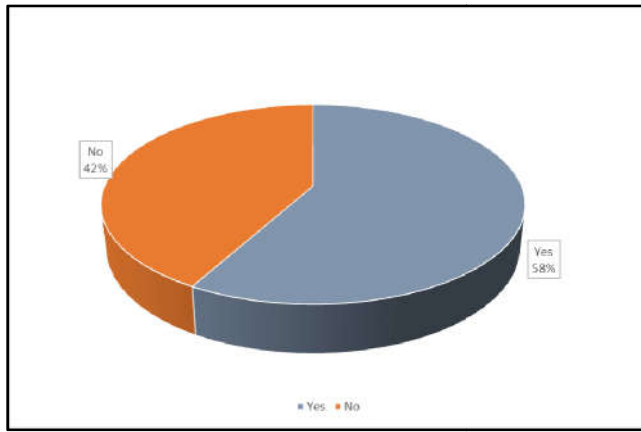


Figure 9. Does the increasing of blood pressure lead to diabetes, and vice versa?



Recommendations

Since diabetes and hypertension are not curable diseases and their treatments have a high cost on the country who spend a huge amount of money which leads to having a negative effect on human resources, therefore, an awareness and consciousness are required among all segments and layers of society such as children, school students, adults, illiterate and the elderly by focusing on the lifestyle of the individual from the beginning of a healthy diet, exercise, hours of sleep, adequate rest and keep away from all causes of these two diseases such as improper food, which leads to obesity, which is one of the major causes. There must be an awareness to diabetic patients not to develop a hypertension by controlling the diabetes mellitus and vice versa. All the pervious points are considered to be the core of our duty as specialists of public health.

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